RESEARCH, DEVELOPMENT & TECHNOLOGY TRANSFER
QUARTERLY PROGRESS REPORT

Wisconsin Department of Transportation
DT1241 02/2011

INSTRUCTIONS:
Research project investigators and/or project managers should complete a quarterly progress report (QPR) for each calendar quarter during which the projects are active.

WisDOT research program category: ☐ Policy research ☒ Wisconsin Highway Research Program ☐ Other ☐ Pooled fund TPF#		Report period year: 2014 ☒ Quarter 1 (Jan 1 – Mar 31) ☐ Quarter 2 (Apr 1 – Jun 30) ☐ Quarter 3 (Jul 1 – Sep 30) ☐ Quarter 4 (Oct 1 – Dec 31)
Project title: Effective Depth of Soil Compaction in Relation to Applied Compactive Energy – Fine-Grained Soil Supplement Project		
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WisDOT project ID: 0092-08-11	Other project ID:	Project start date: 10/10/2007
Original end date:	Current end date:	Number of extensions: 3

Project schedule status:
☐ On schedule ☐ On revised schedule ☐ Ahead of schedule ☒ Behind schedule

Project budget status:

Total Project Budget	Expenditures Current Quarter	Total Expenditures	% Funds Expended	% Work Completed
103914	0	102700	99	96

Project description:

The Wisconsin Department of Transportation has requested the evaluation of appropriate lift thickness for embankment construction under common compactors equipment used in Wisconsin. The lift thickness has direct engineering and economic implications in the design, construction and performance of geotechnical systems such as embankment, foundations and roads construction. The Geological Engineering research group at University of Wisconsin has proposed a series of experimental tests to monitor the compaction effort applied and how the soil properties varied with it. In addition, field monitoring of the compaction process will be performed during the next summer season. Data collected taken from the experimental tests and the field monitoring, recommendation of appropriated lift thickness will be given considering type of soil and compactor equipment.

The proposed work plan complements the study performed on the evaluation of effective depth of compaction on coarse-grained soils. This study will collect and evaluate data from actual embankment construction operations to evaluate the effective depth of compaction on fine-grained soils.

The proposed work plan will be divided in three phases:

I. Evaluation of the response and effect of compaction operations in fine-grained soils
II. Establish correlations between experimental data and theoretical/numerical predictive models
III. Draft recommendations for optimum lift thickness in Wisconsin embankment construction for coarse and fine-grained soils

Progress this quarter (includes meetings, work plan status, contract status, significant progress, etc.):

Data collected in Project 1030-24-76, CTH 11 Frontage Roads, Preconstruction site for testing was being reduced and analyzed. Field testing included the compaction of fine grained soils, at three different lift thicknesses, three moisture contents (wet of optimum, optimum, and dry of optimum), and using two different compaction equipment. Before, during and after compaction we collected surface stiffness data using the GeoGauge device, wave propagation monitoring and particle motion using embedded MEMS accelerometers, shear strength profile using dynamic cone penetrometer, soil pressure at the bottom of the lift, and density and water content measurements after compaction operations.

A manuscript describing some of the early work in this project was published by the KSCE Journal of Civil Engineering in February 2014.

Anticipated work next quarter:

We expect to complete this quarter with the field data interpretation Project 1030-24-76. We plan to submit the final report shortly thereafter.

Circumstances affecting project or budget:

Attach / insert Gantt chart and other project documentation

Phase I - Evaluation of the response and effect of compaction operations on actual embankment construction operations
Phase II - Theoretical/numerical and experimental evaluation of compaction efforts
Phase III - Establish correlations between experimental data and theoretical/numerical predictive models
Phase IV - Draft recommendations for optimum lift thickness
Phase V – Final Report

Table 1: Project time schedule

Phase Number	**1.25 Years (15 months)**				
	Quarter 1	**Quarter 2**	**Quarter 3**	**Quarter 4**	**Quarter 5**
Phase I	X	X		X (if required)	
Phase II		X	X	X	
Phase III		X	X		

Phase IV					X

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Staff receiving QPR:	Date received:
Staff approving QPR:	Date approved: